

# VIDEO SIGNAL DISPLAY

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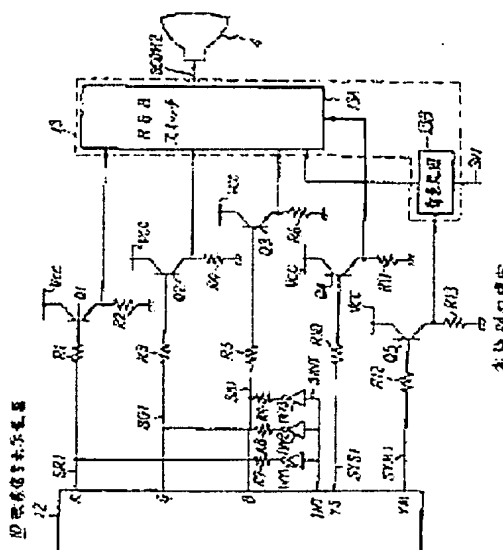
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## Abstract of JP4291582

PURPOSE: To display a character on a displaying video without the sense of incongruity by transmitting the character and displaying the displaying video when the character showing the prescribed information is overlapped and displaying on the displaying video. CONSTITUTION: A character output control circuit 12 makes character video signals SR, SG and SB synchronize with a video signal SV by the input command of a viewer to be outputted and a displaying video BG and a character CH are overlapped and displaying on a displaying screen 4. When the circuit 12 counts the prescribed time, a character half-tone signal SINT and a background color half-tone signal SYM 1 are outputted, the luminance of the character CH and video BG in its displaying area is reduced and the hue is made light. Then, the character CH and the video BG on the screen 4 are displayed by the same luminance and hue. Thus, the viewer can simultaneously recognize both images without the sense of incompatibility.



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[Title of the Invention] Picture signal display apparatus

[Abstract]

A picture signal display apparatus displays a picture signal from a  
predetermined picture source on a display screen as a display picture,  
and superimposes a character which indicates predetermined information,

on the display picture and displays a picture obtained by  
superimposition. In this picture signal display apparatus, an  
arrangement is made such that the display picture appears through a  
transparent character, and the character and the display picture are  
displayed simultaneously. Accordingly, it is possible to display a  
picture which superimposes the character on the display signal without  
an odd feeling for a viewer.

[Claims]

[Claim 1] A picture signal display apparatus which displays a picture  
signal from a predetermined picture source on a display screen as a  
display picture, and superimposes a character which indicate  
predetermined information, on the display picture and displays a picture  
obtained by the superimposition, wherein

an arrangement is made such that the display picture appears  
through a transparent character, and the character and the display  
picture are displayed simultaneously.

[Detailed description of the Invention]

[0001]

[Content] The present invention will be described in the following  
order.

Field of industrial application

Prior art (Fig. 5 and Fig. 6)

Problems to be solved by the Invention (Fig. 6)

Means for solving the problems (Fig. 1 and Fig. 3)

Effect (Fig. 1 and Fig. 3)

Embodiment (Fig. 1 to Fig. 4)

Effect of the Invention

[0002]

[Field of industrial application] The present invention relates to a picture signal display apparatus, and is suitably applicable to a picture signal display apparatus in which a channel display is superimposed on a program picture.

[0003]

[Prior art] In picture signal display apparatuses such as a television display apparatus, an apparatus in which a channel number of a program picture is superimposed on the program picture which is displayed on a display screen have hitherto been available.

[0004] In other words, as shown in Fig. 5, in a picture signal display apparatus 1 a character output control circuit 2 separates a character picture signal, which indicates a channel number, into components of a red color, a green color, and a blue color, and transmits as a red signal SR1, a green signal SG1, and a blue signal SB1 respectively, to a combining circuit 3.

[0005] Moreover, at the same time, the character output control circuit 2, transmits a background blanking signal SYS 1 to the combining circuit 3, in order not to display a program picture of a combined portion which is combined for displaying the channel number, out of the program picture displayed over an entire area of the display screen.

[0006] To the combining circuit 3, for example, a picture signal SV which is received and demodulated by a tuner is inputted. Further, the

combining circuit 3 blanks by the background blanking signal SYS1 a picture signal corresponding to the combined portion which is combined for displaying the channel number, out of the picture signal SV. The combining circuit 3 also obtains a combined picture signal SCOM1 by superimposing the character picture signal (SR1, SG1, and SB1) on each primary color signal formed by the red color, the green color, and the blue color of the picture signal SV. Further, the combining circuit 3, by transmitting the combined picture signal SCOM 1 to a CRT (cathode ray tube) 4, displays a picture in which the channel number is combined with the program picture, on a display screen of the CRT 4.

[0007] Consequently, as shown in Fig. 6, for example, when a picture (image) of the sun is displayed on a display screen 4A of the CRT 4 as a program picture BG, a part of the program picture BG is displayed upon being replaced by a channel number character CH indicating a channel number "1" for example.

[0008]

[Problems to be solved by the invention] Incidentally, when an attempt is made to display the channel number by such method, the program picture BG which is at a background of the channel-number character CH is disappeared, and an eyesoring brightness of the channel number character CH is displayed on a part of the program picture, and there has been a problem that this eyesoring image of the channel number character CH makes the viewing of the program picture BG difficult.

[0009] The present invention is made in view of the abovementioned circumstances, with an object of proposing a picture signal display

apparatus which is capable of displaying upon combining with the program picture, predetermined characters, without giving an unpleasant feeling to eyes of a viewer.

[0010]

[Means for solving the problems] For solving these problems, in the present invention, in a picture signal display apparatus 10 which displays a picture signal SV1 from a predetermined picture source on a display screen 4A, as a display picture BG, and superimposes a character CH which displays predetermined information, on the display picture BG and displays a picture obtained by the superimposition, an arrangement is made such that the display picture BG appears through the transparent character CH, and the character CH and the display picture BG are displayed simultaneously.

[0011]

[Effect] At the time of displaying upon superimposing a character CH indicating predetermined information, on a display picture BG which is displayed on a display screen 4A, it is possible to display the character CH on the display picture BG without an odd feeling for a viewer by displaying the display picture through the transparent character CH, and displaying simultaneously the character CH and the display picture BG, .

[0012]

[Embodiment] An embodiment of the present invention will be described below in detail by referring to accompanying diagrams.

[0013] Fig. 1 is a diagram in which same reference numerals are assigned

to components equivalent to components in Fig. 5. In Fig. 1, a picture signal display apparatus 10 inputs from a character output control circuit 12, a red color signal SR1, a green color signal SG1, and a blue color signal SB1 as primary color signals of a character picture signal which indicates a channel number, to each base of transistors Q1, Q2, and Q3, via resistances R1, R3, and R5 respectively.

[0014] A collector side of the transistor Q1 is connected to a power supply VCC, and an emitter side of the transistor Q1 is connected to earth (ground) via a resistance R2. As an output signal from the emitter side, a red color amplified signal SR2 which is obtained by amplifying a red color signal SR1 to a predetermined signal level is transmitted to an RGB switching circuit 13A of a combining circuit 13.

[0015] Moreover, a collector side of the transistor Q2 is connected to the power supply VCC, and an emitter side of the transistor Q2 is connected to the earth (ground) via a resistance R4. As an output signal from the emitter side, a green color amplified signal SG2 which is obtained by amplifying a green color signal SG1 to a predetermined signal level is transmitted to the RGB switching circuit 13A of the combining circuit 13.

[0016] Furthermore, a collector side of the transistor Q3 is connected to the power supply VCC, and an emitter side of the transistor Q3 is connected to the earth (ground) via a resistance R6. As an output signal from the emitter side, a blue color amplified signal SB2 which is obtained by amplifying a blue color signal SB1 to a predetermined signal level is transmitted to the RGB switching circuit 13A of the combining

circuit 13.

[0017] Moreover, the character output control circuit 12, out of the program picture BG which is displayed over an entire area of a display screen, raises at a predetermined timing to level "H", a background blanking signal SYS1 which is for not displaying a program picture of a combined portion which is combined for displaying the channel number, and inputs the background blanking signal SYS 1 to a base of a transistor Q4 via a resistance R10.

[0018] A collector side of the transistor Q4 is connected to the power supply VCC, and an emitter side of the transistor Q4 is connected to the earth (ground) via a resistance R11. As an output signal from the emitter side, a background blanking amplified signal SYS2 which is obtained by amplifying the background blanking signal SYS1 to a predetermined signal level is transmitted to the RGB switching circuit 13A of the combining circuit 13.

[0019] Moreover, the character output control circuit 12, out of the program picture BG which is displayed over the entire area of the display screen, raises at a predetermined timing to level "H", a background color half-tone signal SYM1 which is for reducing an intensity of the program picture BG of the combined portion which is combined for displaying the channel number, and for making a shade (hue) pale (this is called as a half-tone process), inputs the background color half-tone signal SYM1 to a base of a transistor Q5 via resistance R12.

[0020] A collector side of the transistor Q5 is connected to the power supply VCC, and an emitter side of the transistor Q5 is connected to



the earth (ground) via a resistance R13. As an output signal from the emitter side, a background color half-tone amplified signal SYM2 which is obtained by amplifying the background color half-tone signal SYM1 to a predetermined level is transmitted to a background processing circuit 13B of the combining circuit 13.

[0021] To the background processing circuit 13B, for example, a picture signal SV1 which is received and decoded by the tuner is inputted. Further, the background processing circuit 13B performs a background process on a picture signal corresponding to the combined portion which is combined for displaying the channel number out of the picture signal SV1. The background process is for attenuating the picture signal during rising of the background color half-tone signal SYM 2 to level "H". Further, the background processing circuit 13B transmits the picture signal subjected to the background processing, to the RGB switching circuit 13A.

[0022] To the RGB switching circuit 13A, the picture signal SV1 is inputted. The RGB switching circuit 13A also blanks the picture signal corresponding to the combined portion which is combined for displaying the channel number, out of the picture signal SV1, blanks the picture signal during rising of the background blanking amplified signal SYS2 to level "H". The RGB switching circuit 13A also superimposes the character picture signal (SR2, SG2, and SB2) on each primary color signal which is formed by the red color, the green color, and the blue color. By blanking and superimposing the character picture signal, a combined picture signal SCOM2 is obtained. An arrangement is made such that by

transmitting the combined picture signal SCOM2 to a CRT (cathode ray tube) 4, a picture signal in which the channel number is combined with the program picture is displayed on a display screen of the CRT 4.

[0023] Here, the character output control circuit 12 is provided with a character half-tone signal output terminal INT. The character half-tone signal output terminal INT is for outputting a character half-tone signal SINT which performs the half-tone process by which an intensity of the channel number character CH is reduced, and the color shade (hue) is made pale. Further, an arrangement is made such that the character half-tone signal SINT which is output from the character half-tone signal output terminal INT is output toward output terminals R, G, and B of the character picture signal (SR2, SG2, and SB2), via inverting circuits INV1, INV2, and INV3, and resistances R7, R8, and R9 respectively.

[0024] Consequently, by raising the character half-tone signal SINT to level "H" at a predetermined timing, a signal level of the character picture signal (SR2, SG2, and SB2) is lowered during the rising of the character half-tone signal SINT to level "H". By lowering the signal level of the character picture signal (SR2, SG2, and SB2), the half-tone process is performed on the channel number character CH.

[0025] In the structure mentioned above, the picture signal display apparatus 10 performs a process of displaying the channel number character CH on the program picture, when a channel is specified newly by a viewer, or when a channel display command is specified by the viewer.

[0026] In other words, the character output control circuit 12 starts

an internal timer based on an input command by the viewer, and at the same time, outputs the character picture signal (SR2, SG2, and SB2) upon synchronizing with the picture signal SV1.

[0027] Moreover, at this time, the character half-tone signal SINT is maintained in a state of being held at level "L".

[0028] Consequently, each of the character picture signal (SR2, SG2, and SB2) corresponding to a portion of one horizontal line on the display screen 4A as shown in Fig. 2(A), Fig. 2(B), and Fig. 2(C), is raised to a maximum signal level which is set in advance, during a time from point of time t2 to point of time t3, corresponding to an area displaying the channel number character CH.

[0029] More over, at this time, the background blanking signal SYS1 is raised to level "H" upon synchronizing with the character picture signal (SR2, SG2, and SB2) (Fig. 2(D)), and the background color half-tone signal SYM1 is maintained to be in a state of being held at level "L" (Fig. 2(E)). Accordingly, in a portion in which the channel number character CH is displayed, the program picture BG based on the picture signal SV1 is not let to be displayed.

[0030] As a result of this, on the display screen 4A of the CRT 4, as shown in Fig. 3A, a part of the program picture BG is displayed upon being replaced (in other words, channel number character CH taking priority over the program picture BG) by the channel number character CH of a maximum intensity indicating the channel number "1" specified by the viewer.

[0031] Here, when a count value of the internal timer reaches a time

(three seconds) set in advance, the character output control circuit 12 raises the character half-tone signal SINT to level "H". By this raising, a level of the character picture signal (SR2, SG2, and SB2) raised from the point of time T2 to the point of time T3 is lowered to about 50% of a maximum level, as shown in Fig. 2(F), Fig. 2(G), and Fig. 2(H).

[0032] Consequently, the intensity of the channel number character CH is reduced to about 50% of the maximum value, and the color shade (hue) becomes pale.

[0033] Moreover, at this time, by maintaining the background blanking signal SYS1 in a state of being held at level "L" (Fig. 2(I)), and by raising the background (color) half-tone signal SYM1 to level "H" upon synchronizing with the character picture signal (SR2, SG2, and SB2) (Fig. 2(J)), the intensity of the program picture BG based on the picture signal SV1 is reduced, and the color shade (hue) becomes pale, in the portion in which the channel number character CH is displayed.

[0034] As a result of this, On the display screen 4A of the CRT 4, the channel number character CH which indicates the channel number "1" specified by the viewer is displayed by a color shade (hue) and the intensity of about 50% of the maximum intensity on a portion of the program picture BG as shown in Fig. 3B, the program picture BG is displayed upon reducing the color shade (hue) and the intensity to about 50%, in the display area of the channel number character CH.

[0035] Consequently, on the display screen 4, by being able to display simultaneously the channel number character CH and the program picture

BG with a predetermined intensity (in other words, with brightness with which the brightness of the entire display screen 4A is matched) in the area in which the channel number character CH is displayed, it is possible to achieve an effect in which the program picture BG appears through the transparent channel number character CH. Consequently, the viewer can recognize simultaneously both the images without an odd feeling.

[0036] Furthermore, by displaying the channel number character CH in the program picture BG of a substantial display area, in a state in which the intensity and the color shade (hue) of the channel number character are reduced, the viewer can recognize with priority the entire program picture BG of the substantial display area. Accordingly, even when the channel number character CH is displayed, it is possible to make the program picture BG as whole to be markedly easily viewable.

[0037] According to the structure mentioned above, by making an arrangement such that each of the program picture BG and the channel number character CH are half toned, and displayed combinedly, it makes the program picture BG visible through the transparent channel number character CH. Accordingly, it is possible to display the channel number character CH in the program picture BG without an odd feeling.

[0038] In the embodiment described above, the description is made for a case in which, when the channel is specified newly by the viewer, or when the channel display command is specified by the viewer, after displaying the channel number character CH taking priority over the program picture BG during a predetermined time period, an area in which

the half-tone process is performed on the program picture BG is restricted to a portion in which the channel number character CH is displayed, is described. However, the present invention is not restricted to this case, and an arrangement may be made such that the half-tone process is performed on a predetermined area including the display portion of the channel number character.

[0039] In other words, as shown in Fig. 2(K) to Fig. 2(O), by raising the background color half-tone signal SYM 1 to level "H" during a time from a point of time t1 to a point of time t4, which includes the time from the point of time t2 to the point of time t3 during which the character picture signal (SR2, SG2, and SB2) are raised, and also include a predetermined time before and after the time from the point of time t2 to the point of time t3, it is possible to perform the half-tone process on the program picture BG on the display screen 4A as shown in Fig. 4A, on the display portion of the channel number character CH, and also on an entire predetermined area ARA around the display portion of the channel number character CH.

[0040] As a result of this, the display area of the channel number character CH which is a comparatively small area in the large program picture BG of the display area can be made to be markedly easily recognizable for the viewer.

[0041] Moreover, in the embodiment described above, the description is made for a case in which, when the channel is specified newly by the viewer, or when the channel display command is specified by the viewer, the channel number character CH is displayed only for three

seconds taking priority over the program picture BG. However, the present invention is not restricted to this case, and various time periods are applicable.

[0042] Furthermore, in the embodiment described above, the description is made for a case in which the signal level of the character picture signal (SR2, SG2, and SB2) is reduced to almost 50% of the maximum level, by the character half-tone signal SINT. However, an amount of attenuation is not restricted to this amount, and various amounts of attenuation are applicable.

[0043] In this case, a partial voltage ratio of each of the resistance pairs R1 and R7, R3 and R8, and R5 and R9 (Fig. 1) may be changed.

[0044] Moreover, in the embodiment described above, the description is made for a case in which, when the channel is specified newly by the viewer, or when the channel display command is specified by the viewer, the channel number character CH is displayed by erasing (blanking) the program picture BG in the portion in which the channel number character CH is displayed, for a predetermined time before the half-tone process is performed. However, the present invention is not restricted to this, and the channel number character CH may be combined without erasing (blanking) the program picture BG.

[0045] Furthermore, in the embodiment described above, the description is made for a case in which the half-tone process is performed on the channel number character CH together with the program picture BG, on the display area of the channel number character CH. However, the present invention is not restricted to this, and an arrangement may

be made such that the half-tone process is performed only on the program picture BG.

[0046] In the embodiment described above, the description is made for a case in which, as the half-tone process, the intensity is reduced and also the color shade (hue) is made pale. However, the present invention is not restricted to this, and an arrangement may be made such that any one of the process of reducing the intensity and the process of making the color shade (hue) pale is performed as the half-tone process.

[0047] Moreover, in the embodiment described above, the description is made for a case in which the channel number character CH is displayed. However, the present invention is not restricted to this, and is also applicable widely to cases in which volume level information, etc, and a various types of other information is displayed by combining with the program picture.

[0048] Furthermore, in the embodiment described above, the description is made for a case in which a picture of a broadcast program received by the tuner is displayed as the program picture. However, the present invention is not restricted to this, and is also applicable widely to cases in which at the time of various other pictures such as a picture reproduced by a video tape recorder are displayed.

[0049]

[Effects of the Invention] Thus, according to the present invention, by displaying the display picture upon transmitting through characters indicating predetermined information, it is possible to display by



superimposing the characters on the display picture without an odd feeling for the viewer.

[Brief description of the Drawings]

Fig. 1 is a connection diagram showing an embodiment of a picture signal display apparatus according to the present invention;

Fig. 2 is a signal-waveform diagram for describing an operation of a half-tone process according to the present invention;

Fig. 3 is a schematic diagram showing a display picture when the half-tone process according to the present invention is performed.

Fig. 4 is a schematic diagram showing a display picture according to another embodiment;

Fig. 5 is a block diagram showing a conventional picture signal display apparatus; and

Fig. 6 is a schematic diagram showing a conventional display picture.

[Description of Reference Numerals]

1, 10 ... picture signal display apparatus

2, 12 ... character output control circuit

3, 13 ... combining circuit

4 ..... CRT

4A ..... display screen

SR2, SG2, SB2 ... character picture signal

SINT ... character half-tone signal

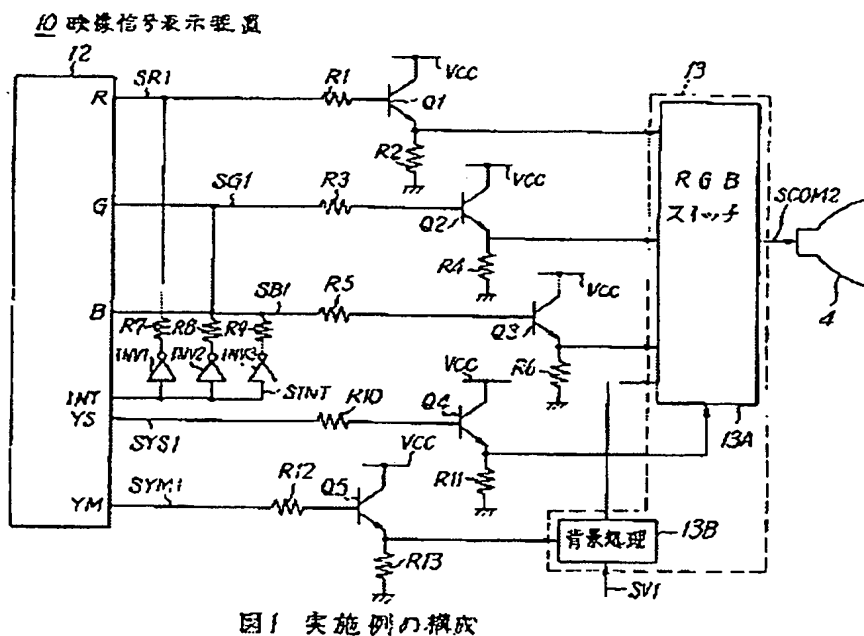
SYS1 ... background blanking signal

SYM1 ... background color half-tone signal

BG ..... program picture

CH ..... channel number character

Fig. 1: STRUCTURE OF EMBODIMENT



4 CRT

10 PICTURE SIGNAL DISPLAY APPARATUS

12 CHARACTER OUTPUT CONTROL CIRCUIT

13 COMBINING CIRCUIT

13A RGB SWITCHING CIRCUIT

13B BACKGROUND PROCESS

Fig. 2 HALF-TONE PROCESS OPERATION

【図2】

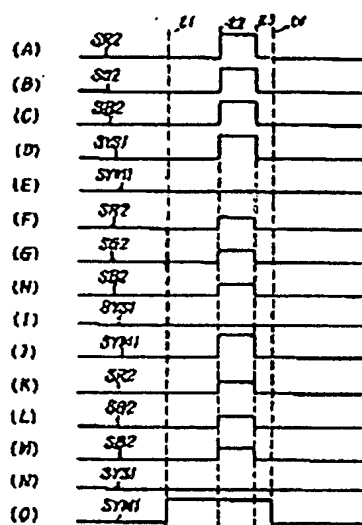


図2 ハーフトーン処理動作

Fig. 3 HALF-TONE PROCESS

【図3】

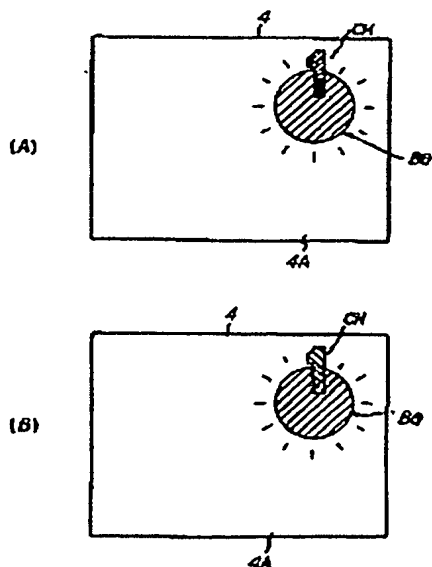


図3 ハーフトーン処理

Fig. 4 OTHER EMBODIMENT

【図4】

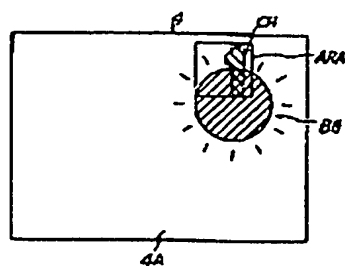


図4 他の実施例

Fig. 5 CONVENTIONAL EXAMPLE (EMBODIMENT)

【図5】

1 映像信号表示装置

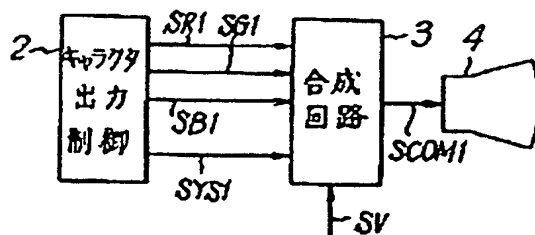


図5 従来例

- 1 PICTURE SIGNAL DISPLAY APPARATUS
- 2 CHARACTER OUTPUT CONTROL CIRCUIT
- 3 COMBINING CIRCUIT

Fig. 6 CONVENTIONAL CHANNEL DISPLAY

【図6】

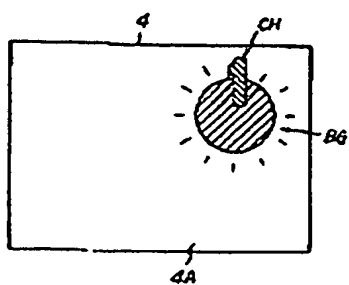


図6 従来のチャンネル表示